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STAAS & HALSEY LLP
SUITE 700
1201 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

EXAMINER	
BELLO, AGUSTIN	
ART UNIT	**PAPER NUMBER**
2633	7

DATE MAILED: 01/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/495,708	KAI ET AL.	
	Examiner	Art Unit	
	Agustin Bello	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 November 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-47* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,7-10,13-24,26,29-32 and 35-47* is/are rejected.

7)☒ Claim(s) *3,5,6,11,12,25,27,28,33 and 34* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 2, 4, 7, 8, 10, 13-19, 24, 26, 29, 30, 32, 35-41, and 45-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Terahara (U.S. Patent No. 6,366,379).

Regarding claims 1 and 45-47, Terahara teaches a selected-wavelength tuning apparatus, comprising: an acoustic optical tunable filter (reference numeral 31 in Figure 13) for branching light into selected-wavelength light and light with other wavelengths in accordance with the radio-frequency signal (column 21 lines 43-47); a radio-frequency signal generating means (reference numeral 63 in Figure 13) for generating said radio-frequency signal; a light intensity detecting means for detecting light from said acoustic optical tunable filter (reference numeral 22 in Figure 1) ; and a radio-frequency signal controlling means (reference numerals 6, 14, 15, 23, 32, 33 in Figure 1) for controlling said radio-frequency signal generating means so as to select light of a predetermined wavelength in accordance with an output of said light detecting means (column 8 lines 6-14). Terahara differs from the claimed invention in that Terahara fails to specifically teach rotating polarization in accordance with a radio-frequency signal in the acousto-optic tunable filter. However, it is obvious but not inherent that the AOTF of Terahara functions by rotation the polarization in accordance with a radio-frequency signal. For example, Terahara teaches that in an AOTF an input light signal is polarized by a polarization beam

splitter, then a wavelength of the signal is rotated by the surface acoustic wave in that the light signal and the surface acoustic wave interfere with one another and only the light signal of part of the wavelength is polarized selectively by surface acoustic wave created by the input of a radio frequency signal. Next, the light signal of the wavelength polarized is polarized and separated by a second polarization beam splitter which allows selection of particular wavelengths. Clearly, the AOTF of Terahara operates according to the same principle of polarization rotation according to an input radio frequency as that claimed by the applicant. Therefore, it would have been obvious but not inherent to one skilled in the art at the time the invention was made that the AOTF of Terahara operates according to the same principle of polarization rotation according to an input radio frequency.

Regarding claims 2, 10, 24, and 32, Terahara teaches a radio-frequency signal controlling means (reference numeral 6, 14, 15, 23, 33 in Figure 1) comprising a value discriminating means (reference numeral 14 in Figure 1) for discriminating a value of said light intensity with respect to an optical signal of a predetermined wavelength by receiving said light intensity from said light intensity detecting means while changing the frequency of said radio-frequency signal generated by said radio-frequency signal generating means (column 10 lines 61 – column 11 line 5); and a frequency controlling means (reference numeral 14 in Figure 1) for controlling said radio-frequency signal generating means so as to generate the radio-frequency with the frequency which makes a light intensity discriminated by said value discriminating means. Terahara differs from the claimed invention in that Terahara fails to specifically teach that the discriminating means discriminates for the maximum value or that the radio-frequency generating means generates a frequency that makes the light intensity the maximum value.

However, Terahara does provide a means for adjusting the intensity of the of the radio frequency supplied to the AOTF, thereby dictating the intensity of the light signal (column 8 lines 6-14 and column 20 lines 41-48) for the purpose of compensation for distortions in the signal or to regulate the light intensity of the output signal. One skilled in the art would clearly have recognized that the system of Terahara would have had the ability to maximize the light intensity of the light signal by maximizing the intensity of the RF signal used to control the AOTF. Furthermore, it is likely that the distortion elimination process taught by Terahara would have resulted in a light signal at maximum intensity. One skilled in the art would have been motivated to have maximized the intensity of the light signal in order to eliminate or prevent distortion in the light signal. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have maximized the intensity of the light signal via the feedback method taught by Terahara.

Regarding claims 4 and 26, it is clear from the discussion regarding claim 2, that the system of Terahara has the ability to maximize the intensity of the light output from the AOTF. One skilled in the art would clearly have recognized that since the AOTF selects a wavelength to output based on the radio frequency signal input to the AOTF, and the intensity of the output wavelength is governed by the intensity of the radio frequency signal input to the AOTF, the AOTF of Terahara would have been capable of maximized the light intensity of the output wavelength every time the optical signal of specific wavelength is changed based on the feedback from the spectrum monitor.

Regarding claims 7 and 29, Terahara teaches the selected-wavelength tuning apparatus according to claim 1, wherein said light intensity detecting means is an optical spectrum analyzer

(reference numeral 1 in Figure 22) for further detecting said light wavelength and said radio-frequency signal controlling means (reference numeral 14 in Figure 1) generates the radio-frequency signal with a known frequency (inherent) and computes the relationship between the selected-wavelength of said AOTF and the radio-frequency based on the output of said optical spectrum analyzer (e.g. the controller observes and determines the state of the RF signal generator on the basis of monitor information, column 8 lines 6-14).

Regarding claims 8 and 30, Terahara teaches the selected-wavelength tuning apparatus according to claim 7, further comprising an optical amplifier (reference numeral 70-1 in Figure 7) connected to the optical input side of said AOTF.

Regarding claims 13 and 35, Terahara teaches an AOTF which outputs an optical signal of specific wavelength in accordance with the frequency of said first radio-frequency signal and the frequency of said second radio-frequency signal as a first output (column 2 lines 13-20), and outputs light with other wavelengths as a second output (column 1 lines 56-59), comprising: first polarizing means (reference numeral 30'-05 in Figure 25) for branching an optical input into TM and TE mode lights (column 1 lines 50-52); first radio-frequency signal applying means (reference numeral 30'-1 in Figure 25) for applying first radio-frequency signal to a first optical waveguide for propagating the TM mode light branched by said first polarizing means; second radio-frequency signal applying means (reference numeral 30'-1 in Figure 25) for applying second radio-frequency signal to a second optical waveguide for propagating the TE mode light branched by said first polarizing means; and second polarizing means (reference numeral 30'-6 in Figure 25) for multiplexing optical signals from said first optical waveguides to which said first radio-frequency signal has been applied and said second optical waveguides to which said

second radio-frequency signal has been applied, and branching them as first and second outputs corresponding to the state of polarization of the light (column 1 lines 56-59).

Regarding claims 14, 17, 18, 36, 39, and 40, Terahara teaches the selected-wavelength tuning apparatus, comprising: AOTF which comprises first polarizing means (reference numeral 30'-05 in Figure 25) for branching an optical input into TM and TE mode lights (column 1 lines 50-52), first radio-frequency signal applying means (reference numeral 30'-1 in Figure 25) for applying first radio-frequency signal to a first optical waveguide which is for propagating the TM mode light branched by said first polarizing means, second radio-frequency signal applying means (reference numeral 30'-1 in Figure 25) for applying second radio-frequency signal to a second optical waveguide for propagating the TE mode light branched by said first polarizing means, and second polarizing means (reference numeral 30'-6 in Figure 25) for multiplexing optical signals from said first optical waveguides to which said first radio-frequency signal has been applied and said second optical waveguides to which said second radio-frequency signal has been applied, and branching them as first and second outputs corresponding to the state of polarization of the light (column 1 lines 56-59); radio-frequency signal generating means (reference numeral 63 in Figure 13) for generating said radio-frequency signal; light intensity detecting means (reference numeral 22 in Figure 1) for detecting the intensity of light from said AOTF; and radio-frequency signal control means (reference numerals 6, 14, 15, 23, 32, 33 in Figure 1) for controlling said radio-frequency generating means so as to select light of a predetermined wavelength in accordance with the output of said light intensity detecting means.

Regarding claims 15 and 37, Terahara teaches the selected-wavelength tuning apparatus according to claim 14, wherein said radio-frequency signal applying means are two radio-

frequency signal applying means (column 2 lines 13-21), of which the first radio-frequency signal applying means (reference numeral 30'-05 in Figure 25) applies the radio frequency signal to the TM mode light branched by said first polarizing means and the second radio-frequency signal applying means (right side of AOTF filter reference numeral 30'-05 in Figure 25) applies the radio-frequency signal to the TE mode light branched by said first polarizing means and said radio-frequency signal generating means supplies the radio-frequency signals of different frequencies to said first and second radio-frequency signal applying means (inherent).

Regarding claims 16 and 38, Terahara teaches that the AOTF filters used in the system can be cascaded (as seen in Figure 19), thereby inherently teaching a third polarization means for branching the lights exited from a first AOTF into TM and TE modes. Terahara also teaches the claimed invention (including intensity detection means) except for first and second intensity detection means. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have included a plurality of light intensity detection means for detecting the intensity of the TE and TM mode lights, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co., 193 USPQ 8.*

Regarding claims 19 and 41, Terahara teaches the optical add/drop multiplexer according to claim 18 and 40, in which a plurality of acoustic optical tunable filters are connected in tandem (see Figure 19).

3. Claims 9 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Terahara in view of Aronson (U.S. Patent No. 5,452,314).

Regarding claims 9 and 31, Terahara differs from the claimed invention in that Terahara fails to specifically teach a plurality of said acoustic optical tunable filters are formed on the same single substrate and temperature controlling means for controlling temperature of the plurality of said acoustic optical tunable filters to be the same. However, Aronson, in the same field of endeavor, teaches it is well known in the art to form a plurality of tunable filters on a single substrate (column 5 lines 3-9) and to include a temperature controlling means (column 5 lines 36-41) for controlling temperature of the plurality of said acoustic optical tunable filters. One skilled in the art would have been motivated to have formed a plurality of tunable filters on a single substrate and to have included a temperature controlling means for controlling temperature of the plurality of said acoustic optical tunable filters in order to reduce the overall size of the system and to maintain the operation of the filters at a nominal temperature, respectively. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have formed a plurality of tunable filters on a single substrate and to have included a temperature controlling means for controlling temperature of the plurality of said acoustic optical tunable filters.

4. Claims 20-22 and 42-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Terahara in view of Robinson (U.S. Patent No. 5,452,314).

Regarding claims 20, 22, 42, and 44, Terahara teaches an AOTF (reference numeral 31 in Figure 13) for rotating polarization in accordance with a radio-frequency signal and for branching light into selected-wavelength light and light with other wavelengths in accordance with the radio-frequency signal; light intensity detecting means (reference numeral 22 in Figure 1) for detecting the intensity of the light from said AOTF; radio-frequency signal controlling

means (reference numeral 6, 14, 15, 23, 32, 33 in Figure 1) for controlling said radio-frequency signal generating means so as to select light of a predetermined wavelength in accordance with the output of said light intensity detecting means. Terahara differs from the claimed invention in that Terahara fails to specifically teach a storage means for storing the frequencies of said radio-frequency signal that changes and light intensity detected by said light intensity detecting means with respect to the frequency. However, the use or a storage means in optical communication system and AOTF systems is very well known in the art. Robinson, in the same field of endeavor, teaches a system wherein AOTF are used to filter selected wavelengths and storage means (column 23 line 62- column 24 line 30) is used to store the frequencies of said radio-frequency signal that changes and the intensity information detected by the intensity detection means of the system. One skilled in the art would have been motivated to have used a storage means to store the frequencies of said radio-frequency signal that changes and intensity of the selected wavelengths in order to track the effects of certain frequencies on certain intensities. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have included a storage means in the device of Terahara as taught by Robinson.

Regarding claims 21 and 43, the combination of Terahara and Robinson differs from the claimed invention in that Terahara fails to specifically teach a rejecting means for rejecting the light exited from said AOTF. However, rejecting means are very well known in the art. For example optical isolators are well known to be used to prevent light propagating in a reverse direction. One skilled in the art would have been motivated to have used a rejecting means for rejecting the light exited from said AOTF in order to prevent light from reflecting back into the AOTF, thereby preventing damage to the AOTF. Therefore, it would have been obvious to one

skilled in the art at the time the invention was made to have included a rejecting means for rejecting the light exited from said AOTF in the device of the combination of Terahara and Robinson.

Allowable Subject Matter

5. Claims 3, 5-6, 11, 12, 25, 27-28, 33, and 34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

6. Applicant's arguments filed 11/3/03 have been fully considered but they are not persuasive. Though the applicant's interpretation of the Terahara reference is correct, it definitely meets the limitations of claimed invention when given the broadest reasonable interpretation. As stated in the office action, Terahara teaches a light intensity detecting means for detecting light from said acoustic optical tunable filter (reference numeral 22 in Figure 1); and a radio-frequency signal controlling means (reference numerals 6, 14, 15, 23, 32, 33 in Figure 1) for controlling said radio-frequency signal generating means so as to select light of a predetermined wavelength in accordance with an output of said light detecting means (column 8 lines 6-14). Therefore, the examiner maintains the rejection of the claimed invention.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Olshanky, Ryan, Wilner, Ball, and Onaka teach relevant art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Agustin Bello whose telephone number is (703)308-1393. The examiner can normally be reached on M-F 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (703)305-4729. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9314 for regular communications and (703)872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-3900.

AB
January 14, 2004

JASON CHAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600